DOCUMENT RESUME

ED 445 483 EF 005 674

TITLE	Pesticides in Schools: Reducing the Risks.
INSTITUTION	New York State Office of the Attorney General, Albany.
PUB DATE	1996-02-00
NOTE	34p.
AVAILABLE FROM	Full text: http://www.oag.state.ny.us/environment/schools96.html.
PUB TYPE	Legal/Legislative/Regulatory Materials (090)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Board of Education Policy; Elementary Secondary Education; *Pesticides; *Public Schools
IDENTIFIERS	Health Hazards; *New York; Poison Prevention; *Warning

ABSTRACT

This report presents findings of state-wide use of pesticides in New York public schools along with a description of the survey, information about the potential dangers of these chemicals, and the steps schools and communities can take to minimize pesticide use. Findings show that 87 percent of New York's schools use pesticides that contain chemicals which may cause immediate or long-term health problems, but only limited precautions are observed. New York City schools reported posting signs only for insecticides applied by "fogging." Students and parents often are unaware of their being exposed to these chemicals. Recommendations include that schools adopt least toxic pest management policies and practices and put these into practice; warning signs should be used before and after pesticide applications along with information about what pesticides are being applied, where, how, why, and by whom; pesticides should be applied by certified personnel; and schools should not use pesticides containing known carcinogens for merely aesthetic purposes, such as lawn care. Appendices provide lists of New York schools that completed the pesticide survey, some active pesticide ingredients reported used by schools, and some sources of information about integrated pest management. (GR)

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Pesticides in Schools:

Reducing the Risks

Attorney General of New York
New York State
Department of Law
Environmental Protection Bureau
Original printing: March 1993
Revised: Feb. 1994, Feb.1996

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NOTE: In 1993, this report was recognized by the New York State Library Association's Government Information Roundtable, with its "Notable Documents Award." The Roundtable commended the Attorney General's Office for an exemplary awareness of the need to provide access to information vital to the public."

INTRODUCTION

Pesticides, a diverse group of toxic chemicals, are widely used in agricultural production, in factories and offices, in homes and restaurants, and in schools.(1) Schools, with their kitchens and cafeterias, athletic fields and playgrounds, classrooms and offices, are regularly treated with a variety of pesticides. An increasing body of scientific data on the potentially harmful effects of pesticide exposure on people and the environment rightfully raises concern about the broad use of these toxic substances. According to the United States Environmental Protection Agency, "All pesticides are toxic to some degree. This means they can

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pesticides, because of their physiology and their activity in the environment. For example, children eat more food, breathe more air, and drink more water per pound of body weight than adults; thus the exposure to and absorption of many toxic substances per pound of body weight will be higher.(3),(4) Also, children are growing and some toxins will damage growing and developing tissues more readily than fully established tissues.(5) Children's behavior also contributes to a greater likelihood of exposure. They play on lawns, in playgrounds and other areas which have been treated with pesticides. Young children often play on the floor inside and on the ground outside. Unwashed hands often find their way to the mouth or to unwrapped snacks. The likelihood of exposure exists during outdoor activities on playgrounds, lawns and athletic fields which have been treated with pesticides. Children may ingest dirt containing pesticides, and they may not read, understand or pay attention to warning signs.

Over the years, the Attorney General's Office has received inquiries from parents worried that their children may be exposed to pesticides used in their schools. Schools in New York, as well as in other states, have experienced incidents in which students and staff have been unwittingly exposed to excessive levels of pesticides, and some have suffered health consequences. Recently, on October 27, 1992, the Westchester County Department of Health closed down the Eastchester High School for three weeks after students and staff complained of nausea, headaches, eye irritation and respiratory problems. The day before, an exterminating company had applied the insecticides resmethrin, chlorpyrifos and diazinon in the school.

Reports from schools around the country reinforce the rising apprehensions over pesticide use. In 1989, in Charleston, West Virginia, after four years of complaints by students and teachers about persistent fatigue, headaches, respiratory problems, nausea and numbness in limbs, a school was finally closed after inspectors found that it was contaminated with chlordane, a chemical used to kill termites. Chlordane was found to be leaking from the foundation of a Yaphank, Long Island elementary school in 1985, after the school received complaints of illness and water contamination problems. (The New York State Department of Environmental Conservation banned the use of chlordane in New York State in 1985. The United States Environmental Protection Agency banned the use of chlordane nationally in 1988.)

Based on concerns that children and staff may be unnecessarily and unwittingly exposed to pesticides in their schools, the Attorney General's Office in the Fall of 1991 initiated the first state-wide study of pesticide use in New York State in the public schools. This report describes this state-wide survey, provides information about some of the potential dangers of these chemicals, and recommends steps that schools and communities can take to minimize pesticide use.(6)

The Attorney General's Office wishes to thank the school administrators and staff who took the time to compile the information we requested and used in this report.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Our first step was to determine whether New York's schools use pesticides, and if so, what kind, where, and when. Our second step was to ascertain what kinds of precautions, if any, are taken to reduce exposure. We found that 87% of schools use pesticides, and that all of the pesticides used contained substances which may

cause immediate or long-term health problems.

Despite this widespread use of pesticides, often only limited precautions are taken. For example, only 21 percent of schools outside New York City reported posting warning signs around indoor areas that have been treated with pesticides, and less than 43 percent posted signs for outdoor applications. New York City schools reported posting signs only for insecticides applied by "fogging." While pesticides may be used in all parts of a school -- most often in kitchens and cafeterias -- and on the grounds outdoors, staff, students and parents most often have no way of knowing when they may be exposed.

According to the U.S. Environmental Protection Agency, "no pesticide can be considered 'safe'...."(7). All pesticides pose some risk, and the possible chronic health risks for many pesticides remain uncertain. The survey findings, by illustrating the widespread use of pesticides and the inadequacy of posting and notification practices, underscore the need for schools to minimize pesticide use. In instances where it is determined that pesticide use is absolutely necessary, the application of these toxic chemicals must be done with appropriate care and proper precautions. The following recommendations, aimed at eliminating and reducing pesticide applications in and around schools, are discussed in greater detail later in this report.

Schools should adopt least toxic pest management policies and practices in order to reduce or eliminate pesticide use, and should select the least toxic pesticides in situations where pesticide use is deemed to be essential.

Schools should put their pest management policies in writing and make these policies public.

If pesticides are used, schools should notify school staff, teachers, administrators, students and their parents.

Before and after pesticides have been applied, warning signs should be posted around the treated area.

Only certified applicators should apply pesticides at schools.

All schools should maintain detailed information about what pesticides are being applied, where, how, why and by whom.

Schools should not use pesticides containing known or probable carcinogens for merely aesthetic purposes, such as lawn care.

The emergency management plans that school districts are required to prepare should address emergencies involving pesticides.

PESTICIDES AND SAFETY

We decided to investigate the use of pesticides in schools because questions surround the safety of pesticides and because children, who are particularly vulnerable to harmful substances in their environment, may be exposed to pesticides in their schools.

Pesticides may cause both acute and chronic health effects. Acute health effects are those which appear shortly after exposure. Chronic health effects may not be apparent until months or years after exposure. Chronic effects generally result

from long-term exposure to low levels of toxic chemicals, but also may arise from short-term exposures. By the time the symptoms of a chronic effect become apparent it may be difficult or impossible to prove that they were caused by a particular pesticide exposure.(8)

Children may be particularly susceptible to the immediate effects of acute pesticide poisoning, although no statistics are available on the number of such incidents that occur in schools. However, there is no question that children are exposed to pesticides. Every year, Poison Control Centers across the United States receive thousands of reports about children exposed to pesticides; the numbers are increasing. In 1991, the Centers received reports of 83,325 pesticide exposures; of those, at least 67 percent involved children under the age of 18.(9)

Pesticides pervade our daily lives: many people are now realizing that these chemicals may cause more serious problems than they cure. As parents, as concerned citizens, as potential users of pesticides, we must evaluate the true benefits that pesticides may bring to our lives and make reasoned choices about when, where, why and if pesticides should be used.

Pesticides are not harmless; they are poisons designed to kill target organisms. Although all pesticides marketed must be registered with the United States Environmental Protection Agency ("EPA"), registration is not a guarantee of safety. In fact, EPA has officially stated that no pesticide -- restricted use or general use -- can be considered safe.(10) All pesticides pose some risk -- although some may pose lesser risk than others -- and the possible chronic health risks for many pesticides remain uncertain.

When the EPA registers (permits to be sold) a pesticide, the agency does not decide that the product poses no environmental or health threats. Rather, the EPA is required to register a pesticide if it determines that the product will not generally cause, according to federal pesticide laws, "unreasonable adverse effects" to public health or the environment, when weighed against its perceived economic, social and environmental benefits. Thus, the registration decision is based on balancing the benefits against the risks. If the benefits outweigh the risks, then the pesticide may be registered. If new information indicates that a pesticide may pose a more serious threat then was realized, the balance may change, and EPA may place conditions on that product's use or take it off the market by temporarily suspending or permanently cancelling its registration. Cancellation means a pesticide can no longer be sold or used in the United States, although, in practice, existing stocks may continue to be sold or used for a year or more.

Under its regulatory authority, the EPA may request additional data from pesticide registrants at any time deemed necessary. As part of a continuing "reregistration" process, the EPA is currently reviewing data on the health and environmental effects of many pesticide active ingredients to decide whether these products should continue to be used. (An "active" ingredient in a pesticide product is that ingredient designed to kill, repel or otherwise control the target pest.) Many of these products were registered years ago under less rigorous testing guidelines than are currently in effect. As this limited review proceeds, thousands of pesticides containing active ingredients still under review remain on store shelves, until the EPA decides whether or not to restrict or even eliminate their use. Unfortunately, Congressional reports estimate that EPA's verdicts will not come in for many more years -- sometime in the next century.

In addition, EPA's "reregistration" only looks at the *active* ingredients. The other

components of the pesticide product are the so-called "inert" ingredients, which are chemicals that may deliver the active ingredients to the target, preserve them or make them easier to apply. These "inert" ingredients usually are not even identified on the product label. "The Secret Ingredients in Pesticides," a report issued by the Attorney General's Office, showed that the "inerts" in some products include substances which may cause serious health effects. Without easily available information about "inerts" on the label, people do not know the health risks to which they may be exposed, and health care providers may find it more difficult to timely diagnose and treat pesticide-exposure problems. A recent report by EPA's Inspector General indicates that, for hundreds of registered pesticides, even the EPA does not have an accurate accounting of the "inert" ingredients.(11)

SURVEY METHOD

Due to the increasing concern over the potential risks posed by pesticide exposure, especially to children, the Environmental Protection Bureau of the New York State Attorney General's Office surveyed 331 schools in New York State in the Fall of 1991, to gather information on the use of pesticides and pest management practices in New York State public schools.

A variety of schools across the State were selected to adequately reflect the diversity of school districts in New York. In the school year 1991 - 1992, over 2,547,000 students were enrolled in more than 3900 public schools in 718 districts throughout New York State. Because over half of these students were enrolled in schools in New York City (Manhattan, Brooklyn, the Bronx, Queens and Staten Island) and Long Island (Nassau and Suffolk counties), half of the schools surveyed were from this downstate area. The remaining half were from each of the 55 counties in the northern New York City suburbs and upstate New York.

The Bureau made special efforts to select an adequate sampling of schools to allow proper comparison between schools and regions across the state. For the schools in the northern suburbs and upstate, one elementary, one middle and one high school were surveyed from different school districts in each of the 55 counties. To ensure that different sized districts were represented, one school was chosen from the district with the highest enrollment and the two other schools were selected from districts with lower enrollments. In Schuyler and Yates counties, each having only two school districts, one school was surveyed in each district. In total, 163 schools were surveyed in these 55 counties.

In New York City and Long Island, a total of 168 schools were surveyed: 48 schools were chosen from Nassau and Suffolk Counties -- 8 elementary, 8 middle and 8 high schools from each county. In New York City, 120 schools were selected, at least one from every district (excluding special school districts).

The schools surveyed included 111 elementary schools, 102 middle schools, 104 high schools, and 14 schools which did not fit into one of these categories.

The schools responding to the survey were cooperative and forthcoming. Of the 163 Upstate schools surveyed, 71.2 percent (116) responded. In Nassau/Suffolk, 52.1 percent (25) of the 48 schools surveyed responded. In New York City, pest control management is directed from a single department, the Pest Control Unit of the NYC Board of Education. This unit responded on behalf of all 120 schools surveyed -- in effect a 100 percent response rate. Appendix A provides a list of the schools which responded to the survey.

RESULTS

Which Schools Use Pesticides?

The survey revealed that 87 percent of the responding schools used pesticides. Pesticides are applied at every New York City school, according to survey responses, and at 88 percent of Nassau/Suffolk schools. Schools in the northern New York City suburbs and upstate New York reported the lowest rate of use, 74 percent. (See Table 1 for breakdown of indoor and outdoor applications.) Schools that did not report pesticide use are indicated with an asterisk in Appendix A.

Where Are Pesticides Used?

Schools reported that they used pesticides during the 1990 - 1991 school year in a wide variety of locations, including classrooms, offices, playgrounds, lawns, playing fields, locker rooms, bathrooms, storage rooms, basements and even a school gym and day care room. Kitchens and cafeterias are the areas most frequently treated with pesticides. Schools applied pesticides to eliminate a variety of pests, including weeds, mice, cockroaches, ants, flies, lice, ticks, fleas and other insects. New York City reported applying pesticides outside specifically for bees, wasps, ants, rodents and pigeons.

TABLE 1: Pesticide Use By Region (Percent of Total Respondents)

Region	Indoors	Outdoors	Either/Both
Statewide	84	*	87
New York City	100	*	100
Nassau/Suffolk	88	71	88
Northern suburbs & upstate	68	56	74

**The NYC Board of Education Pest Control Unit was unable to provide complete information on its schools' outdoor pesticide use.*

The PCU reported that rodenticides were used outdoors at up to 10 percent of the NYC schools, and insecticides were used outdoors at up to 3 percent of the schools. The PCU further reported that it does not perform "broadcast" applications of herbicides outdoors, although individual schools may do so. The PCU did not have information available on how many schools, if any, applied herbicides outside.

What Kinds of Pesticides Are Applied?

At least 50 different active pesticidal ingredients are being applied to the buildings and grounds of the schools in New York State. The pesticides most commonly used by the responding schools include the insecticides chlorpyrifos and bendiocarb and the herbicides 2,4-D and dicamba.

The pesticides most frequently used in schools may cause short-term, acute, or long-term, chronic, health effects. These may include vomiting, diarrhea, convulsions, headaches, skin irritations, liver damage, as well as behavioral and emotional disturbances. Other pesticides used in schools may cause reproductive system disorders, flu-like symptoms and asthma-like problems. (See Table 2.) Often, but not always, acute effects are caused by short-term exposure to a large quantity of pesticides. While acute injuries are a significant concern in connection

with misapplication or accidental spills, many people are particularly concerned about the more-difficult-to-detect chronic effects, which may arise from the routine use of pesticides. Chronic effects may result from long-term exposure to apparently low levels of pesticides, but it is often difficult to demonstrate that such effects are the result of a particular pesticide exposure.

TABLE 2: Some Health Effects of Various Pesticides Used in Schools

Pesticide (Trade Name)	Sample Target Pests*	Potential Health Effects**
Chlorpyrifos (Dursban)	Insecticide: cockroaches, ants, termites, fleas, mosquitos	headache, nausea, dizziness, abdominal cramps, vision problems, persistent weight loss, toxic psychosis, convulsions
MCPP (mecoprop)	Herbicide: broadleaf weeds, e.g. clover and dandelions	skin irritation, vomiting, unconsciousness, coughing, dizziness, sensory and behavioral disturbances, spasms, sweating
Dicamba	Herbicide: broadleaf weeds	skin irritation, vomiting, unconsciousness, coughing, dizziness, sensory and behavioral disturbances, spasms, sweating
Bendiocarb (Ficam)	Insecticide: ants, fleas, ticks, cockroaches, silver-fish, crickets	diarrhea, muscle weakness, dizziness, headache, blurred vision, sensory and behavioral disturbances, spasms, sweating
Acephate (Orthene)	Insecticide: cockroaches, ants	headache, flu-like symptoms, possible human carcinogen, reproductive effects, interferes with nerve impulse transmission
Cypermethrin (Demon)	Insecticide: cockroaches, ants	allergic dermatitis, flu-like symptoms
2,4-D	Herbicide: broadleaf weeds	vomiting, diarrhea, anorexia, ulcers of the mouth and pharynx, damage to the liver,
Piperonyl butoxide	(Synergist included in many pesticides to enhance "active" ingredients)	may enhance toxic hazard of insecticides to humans, oncogen

** Source for target pests: manufacturers' product labels. N.B. We did not determine whether all products were used strictly in accordance with label directions.*

*** Source for symtoms: Recognition and Management of Pesticide Poisonings, U.S. Environmental Protection Agency, 4th edition, March 1989. Some of these are acute effects, some are chronic effects, and some may be either acute or chronic, depending on the exposure.*

Depending upon the pesticide, the target pest, the site to be treated, and other considerations, pesticides may be applied as powders, pellets, liquid sprays, fogs or mists, or mixed with some sort of bait to attract the pest. In each case, human exposure may occur. It may be at the application site or at other locations to which the pesticide may be carried by air-borne drift, surface run-off or tracking, as well as by routine mopping or sweeping activities. Pesticides do not disappear immediately after application. They may take days, weeks, even months, to break down outdoors. Indoors, away from sunlight and soil bacteria which often help in their breakdown, pesticides may persist far longer. Even natural breakdown is not always the answer; for some pesticides, the natural breakdown product is even more toxic than the original pesticide.

Appendix B lists some of the chemicals reported to be used by the schools.

Who Applies Pesticides in Schools?

New York City reported that only school employees who have passed a State administered test to become certified pesticide applicators applied pesticides inside the schools. Outside, certified school employees made "spot applications" while individual schools hired independent contractors to make "broadcast" pesticide applications using power equipment. Elsewhere in the state, both school employees and independent contractors were used to apply pesticides indoors and outdoors. (See Table 3.)

TABLE 3: Who Applies Pesticides In Schools

(Percent of Respondents Using Pesticides)

		Schools Using Only Independent Contractors	Schools Using Local Staff Also or Exclusively
Statewide	Indoor	33	63
	Outdoor	20	*
New York City	Indoor	0	100
	Outdoor	0	*
Nassau/Suffolk	Indoor	81	10
	Outdoor	47	12
Northern suburbs	Indoor	73	21
& upstate	Outdoor	13	53

** The New York City Board of Education Pest Control Unit reported that, at NYC schools, outdoor applications may be made by either independent contractors, or by local staff, depending upon the type of application. The PCU does not make "broadcast" herbicide applications outside, although individual schools may opt to perform such treatments themselves or have independent contractors make those applications. PCU applicators do utilize rodenticides and insecticides outside.*

In our judgment, pesticides should only be used when target pests are present at problem levels. Using pesticides on a scheduled basis, regardless of whether a pest problem is present, is likely to lead to overuse.

We asked schools whether pesticides are applied responsively -- that is, only when necessary to control a pest problem -- or on a routine, preventive basis when no problem may exist. Table 4 illustrates the responses by region.

We found that while outdoor applications were most often made responsively, indoor treatments were more often applied routinely.

TABLE 4: Application Schedule

(Percent of Respondent Using Peticides)

		Only Routinely	Only Responsively	Both
Statewide	In	22	12	66
	Out	12	*	5
New York City	In	0	0	100
	Out	0	*	0
Nassau/Suffolk	In	38	19	43
	Out	18	71	12
Northern suburbs	In	52	29	20
& upstate	Out	33	52	14

** New York City Board of Education PCU reported that its schools apply pesticides (insecticides and rodenticides) outside only responsively. As noted in Table 1, for the school year 1990-1991, up to 10 percent of the NYC schools used rodenticides outside, and up to 3 percent used insecticides outside.*

What Precautions Are Taken?

According to a 1986 report by the United States General Accounting Office, an independent research office of Congress, "when pesticides are applied in places such as schools, . . . the public may not be aware of their use, and may be exposed to pesticides without their against their will."(12) In our judgment, clear and conspicuous notification both before and after pesticide application, is an obviously essential precaution in order to minimize human exposure. Unfortunately, our survey uncovered serious deficiencies in the notification and warning practices of New York schools.

According to the survey results, few schools in New York notified parents, administrators, teachers or students before pesticides were applied. Less than 3 percent of the schools reported notifying all four groups before an indoor pesticide application. (Table 5 illustrates the general notification practices by region.) Only 7 percent of schools using pesticides reported that they notified all groups before outdoor applications. Students and parents were rarely notified, although 19 percent of Nassau/Suffolk schools responding reported that students were notified for outdoor applications. Administrators appeared to be the most likely people to be notified of indoor or outdoor applications.

As to post-application warnings, state law provides that public agencies (including public schools), must post warning markers when applying pesticides to grounds or vegetation within one hundred feet of a public building (including schools). Those markers must be within or long the perimeters of areas where pesticides will be applied. They are to be placed on the day the pesticides are applied and must remain in place for at least twenty-four hours.(13)

TABLE 5: Pre-notification of Pesticide Applications

		Percent of Pesticide Users Pre-notifying:				
	Site	**Admin.**	**Teachers**	**Parents**	**Students**	**All**
Statewide	In	20	11	2	2	2
	Out	24	12	3	5	3
New York	In	0	0	0	0	0
City	Out	0	0	0	0	0
Nassau/	In	66	33	5	10	5
Suffolk	Out	71	29	5	19	5
Northern	In	39	21	4	5	4
suburbs	Out	56	28	8	10	8
& upstate						

We specifically inquired about the posting of warning signs in and around areas treated with pesticides, for both indoor and outdoor applications. Outside New York City, only 21 percent of schools that used indoor pesticides said warning signs were posted in and around indoor areas treated; less than 43 percent of those schools that used pesticides outdoors said that signs were posted even though the law may require such posting. We urge the remaining schools to comply fully with the law.

The New York City Board of Education Pest Control Unit reported it did not post for outdoor rodenticide or insecticide use. (The PCU does not apply herbicides outdoors, but reported that individual schools may do so. The PCU did not have information available on the posting practices in those schools.) As Table 6 shows, a great disparity in posting exists among the three regions.

TABLE 6: Schools Posting Sings

	Percent of Pesticides Users Posting for:	
	Indoor Application	**Outdoor Application**
Statewide	65	**
New York City	100*	**
Nassau/Suffolk	38	70
Northern suburbs & upstate	18	52

** Signs are posted only when insecticides are applied by "fogging" method.*

*** The New York City Board of Education PCU reported that it does*

not, and is not required to, post for the rodenticides it applies outdoors; the PCU had no information available on the posting practices of schools which might choose to "broadcast" herbicides outdoors.

Although adherence to appropriate notification and warning procedures was disappointingly low, schools reported that they took other precautions: Seventy-two percent of schools in the northern suburbs and upstate, 81 percent of Nassau/Suffolk schools and 100 percent of New York City schools said they took at least some steps to minimize exposure. In addition to posting warnings, these precautions included:

- following directions on the manufacturer's label,
- observing regulations imposed by DEC,
- applying pesticides only when the area is unoccupied,
- restricting access to treated areas for periods ranging between 30 minutes to 48 hours, and
- restricting time of applications to after-school hours.

New York City reported that, although no notification was specifically given to anyone, "for certain treatments and for required services, agreeable times and dates are arranged beforehand, serving as notice to those affected."

Most -- but not all -- schools providing any kind of prior notification indicated that the warnings were verbal, not in written form.

Are Records Kept?

New York State law requires that certain records be kept of pesticide use by certified applicators and pesticide application businesses. If the application is performed by an employee, that person must keep the records; if by an outside contractor, then that business must keep the records. Failure to keep a complete set of records, as described below, is a violation of State regulations.(14)

The majority of schools reported that they maintained written records of pesticide use, although our survey did not ask respondents to specify what particular records were kept.

Thorough record-keeping of all pesticide applications is an integral part of proper and preventive pest management. Records provide a tool to analyze and prepare appropriate pest control; they may also help health care providers to diagnose and treat possible health effects. Table 7 illustrates the practices in record keeping overall and among regions.

TABLE 7: Percent of Pesticide-Using Schools Maintaining Written Records of Applications

	Outdoor	Indoor
Statewide	89	86
New York City	100	100
Nassau/Suffolk	82	91
Northern suburbs & upstate	70	62

Do Schools Have Written Policies?

We also asked whether schools had any written policies governing pesticide use. Only 4 percent of schools in the northern suburbs and upstate regions that reported using pesticides had a written policy, compared to 29 percent in Nassau/Suffolk. New York City has a written policy governing pesticide management and applications for all of its schools.

Do Schools Use Non-Chemical Pest Controls?

Although the survey reveals that the overwhelming majority of New York public schools relied primarily on chemical methods to control their pests, 92 percent of the schools that use pesticides indoors also use some non-chemical alternatives to combat their indoor pest problems. Comparatively, among schools outside New York City, only 55 percent employ non-chemical alternatives for outdoor treatments. We did not inquire as to how extensively or frequently such alternatives are used.

Schools reported using a variety of alternatives, including physical removal of the pests, mechanical traps, biological controls, improved sanitation, and physical barriers. Nonetheless, despite the use of non-chemical pest controls, the routine use of toxic chemical pesticides appears to be a well-entrenched practice in the New York State public school system.

RECOMMENDATIONS

The results of this first state-wide study of pesticide use in New York public schools indicate that in the school year 1990 - 1991, chemical pesticides were applied in most schools and all of these contained substances which may cause immediate or long-term health problems. Despite widespread use of pesticides, 79 percent of the schools outside New York City did not report posting warning signs around indoor areas that have been treated with pesticides. Fifty-seven percent of those respondents did not report posting signs for outdoor applications even though the law requires it in many instances. New York City reported posting signs only for insecticide "fogging" indoors.

The vast majority of schools warned neither students nor parents before a specific pesticide application, although up to 71 percent of the schools responding from Nassau and Suffolk Counties and the northern suburbs and upstate regions reported notifying administrators and teachers. While pesticides may be used in all parts of a school -- most often in kitchens and cafeterias -- many people in the school have no way of knowing when or where they may be exposed to these chemicals, or even the identity of the pesticides.

This survey provides a look at pesticide use in New York public schools and describes some possible dangers of current practices. Many questions remain. Parents, teachers, administrators, other school staff, and students need to examine pest management practices in their communities, and ask whether the perceived benefits of chemical pest control outweigh the potential risks. In many cases, non-chemical, least toxic pest control methods have proven to be as effective and as available, as chemical pesticide applications.(15) They have been successfully employed in institutional settings. Nevertheless, few schools employ these less toxic measures widely and most instead continue to rely on extensive use of pesticides.

The survey underscores the need to change the way schools manage insect, weed and

other pest infestations. Given the fact that real alternatives do exist, every effort should be made to reduce the use of chemical pesticides in schools. Implementing the following recommendations will help minimize risks and create safer school environments.

Schools should adopt least toxic pest management policies and practices in order to reduce or eliminate pesticide use, and should select the least toxic pesticides in situations where pesticide use is deemed to be essential.

Many schools across the country are eliminating or significantly reducing their pesticide use by adopting Integrated Pest Management ("IPM") practices, which use a combination of natural and least toxic controls.(16) Routine applications of pesticides may in fact exacerbate a pest problem by, for example, causing insects to develop resistance to the type of pesticide used, or creating new habitats for noxious weeds such as poison ivy. By contrast, IPM uses information about a pest's life-cycle and habits to control it with a minimum impact on the environment and human health.

Some New York schools are leading the way. At the Thomas O'Brien Academy of Science and Technology in Albany, the recently implemented "no-pesticide" pest management is now working so well that the city school district may expand the program to another school. In 1992, the Canajoharie Central School Board adopted a "least toxic" pest management policy,

with the ultimate goal of eliminating all pesticide use. The Schalmont School District, near Albany, in 1991 began replacing the chemical fertilizers, insecticides and herbicides (used to treat its athletic fields) with organic compost mix. In 1986, the Kenmore-Town of Tonawanda school district ordered a moratorium on using pesticides at its 12 schools, to determine health and safety effects on the district's 10,000 students and teachers. Since then, the school district has continued to use "least toxic" pest management practices.

In October 1991, on a large scale, the San Diego, California schools agreed to implement a comprehensive IPM policy. In Maryland, the Montgomery County public school system adopted an IPM approach that reduced its pesticide use by 90 percent between 1988 and 1990 and has become a model for approximately 500 public schools in that state. Dade County, Florida -- the fourth largest school system in the United States -- has implemented an IPM program with the goal of eliminating all pesticide use in its public schools.

Other state and even federal agencies are also eliminating or reducing their pesticide use. In 1991 - 1992, the NYS Office of General Services banned pesticide spraying in its more than forty office buildings and other facilities and began its IPM program which relies on a combination of preventive maintenance, regular monitoring for pests, and, if necessary, "least toxic" chemicals such as boric acid to control those pests. The United States General Services Administration has virtually eliminated pesticide spraying in office space of the agency's 30 million square feet in Washington, D.C. Texas now requires, by law, all its schools to adopt IPM programs by September 1995.

Schools should put their pest management policies in writing and make these policies public.

Pest control should not be a secret operation, decided on and known only to the administration. Administrators should encourage parents, teachers, and other school staff, to participate in policy decisions regarding pest management,

because they may be the victims of exposure to any pesticides used. In particular, state-wide and regional parent-teacher associations and organizations as well as teachers' and other staffs' unions should work with school administrators to reduce the use of pesticides and implement Integrated Pest Management programs. Such groups could review pesticide policies, provide a range of perspectives, and establish a communications framework. In this way, people most directly affected by pesticide use in schools could voice their health and environmental concerns and assist administrators in choosing among alternatives.

Adopting written policies, and involving the entire school community, can help produce the most appropriate, acceptable and least-toxic pest management approach. Saranac Central School District, for example, reported that in 1991 it informally adopted a working written policy providing that pesticides shall be used only as a last resort, if other, non-chemical and less toxic pest controls are proven ineffective. The policy also provides for posting warnings, various safety precautions, appropriate training for staff, and record keeping.

A number of other school districts throughout the country have also adopted written policies that govern pesticide management and use in the schools within their districts. For example, in California, the Berkeley Unified School District adopted a written policy in 1984 which:

Established a pest management committee comprised of informed citizens and school staff to advise the school district on appropriate pest management issues;

Developed plans for the safest and most effective approach to each pest problem, with any non-chemical alternatives to be employed first;

Established criteria for selecting chemicals to be used in the district, prepared by the pest management committee with public input; and

Required prior public notice of any school district pesticide use.

If pesticides are used, schools should notify, in advance, school staff, teachers, administrators, students and their parents.

This notice should identify the pesticides to be used, the target pests, the locations to be treated, and should direct any concerned individual to a place where pesticide product labels are available for inspection. These labels include information about health and environmental effects and precautionary measures. Under New York State's Environmental Conservation Law Article 33, Title 9, certified applicators must provide this information to their customers. In schools, parents, students, teachers and administrators are "customers" too and have a right to know the identity and potential health risks of pesticides to which they may be exposed. Schools should also provide access to Material Safety Data Sheets ("MSDSs") which should include more specific information about potential health effects of exposure.

While it may not be necessary to notify all staff, parents and students prior to "spot applications," schools should provide full notification, at the beginning of every school year, including product labels, MSDSs and approximate dates of application. Then, parents or staff who may wish additional information will be aware of the possible applications and risks.

Before and after pesticides have been applied, warning signs should be posted around the treated area.

Currently, New York State law requires that commercial pesticide applicators post warning signs around the perimeter of lawns which have been treated with pesticides. Public agencies, including schools, must comply with this requirement when the application is within one hundred feet of a school, dwelling, public park or other public buildings. This should be expanded to require schools to post understandable warning signs around all areas -- indoors and out -- where pesticides will be and have been applied. This would allow staff, parents and students to minimize or avoid exposure.

Only certified applicators should apply pesticides in schools.

Under the Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA") and the New York State Environmental Conservation Law (Article 33), certain more dangerous pesticides are designated as "restricted use" pesticides. As such, they may only be applied by a certified applicator who has passed a State-administered examination, or may only be applied under certain, very limited conditions. Other, "general use" pesticides may be applied by anybody, although label restrictions on place, time or type of application may apply.

Under FIFRA, an applicator need be certified only if using restricted use pesticides and not working under the supervision of a certified applicator. Under a more rigorous New York State law, all "commercial" pesticide applications, which include all applications at schools, must be performed by or "under the direct supervision of" a certified applicator, regardless of whether general or restricted use products are applied.(17) (To obtain a "commercial certification," the New York State Department of Environmental Conservation ["DEC"] requires at least three years of commercial application experience under the supervision of a certified applicator, and successfully passing a DEC administered examination.) However, the phrase "under the direct supervision of" does not require that the certified applicator actually be on the premises at the time an application is made.(18)

School administrators should allow **only** certified applicators to apply pesticides in schools. Permitting applications under the supervision of a certified applicator may at times be inadequate to ensure proper applications.

Trained, certified applicators can minimize pesticide misuse and the possible risks of pesticide exposure. All certified applicators should be required to attend training to learn, for example, how to mix pesticides; the hazards of pesticides and precautions that need to be taken when using them; current State and Federal laws and regulations governing the use of pesticides; the life cycle of the particular "pests" being targeted; and worker safety. Certification training may also include other information that will make pesticide use, according to New York State law, "more effective and less hazardous to the applicator and non-target organisms, including humans and pets."(19) Also, certified applicators should be trained to use least toxic pest management practices.

All schools should maintain detailed information about what pesticides are being applied, where, how, why and by whom.

New York State law requires such records to be kept by certified applicators, and many schools, in which certified employees apply the pesticides, already do this. All other schools should follow, including schools which hire outside contractors to apply pesticides. Proper diagnosis and treatment of any pesticide exposure by health care workers may be dependent on complete and readily available information about the history of exposure and what chemicals were used. These

records may be useful not only for diagnostic and treatment purposes, but will assist in evaluation of long-term pest management practices as well as possibly protecting schools themselves against unnecessary liability for personal injuries.

Schools should not use pesticides containing known or probable carcinogens for merely aesthetic purposes, such as lawn care.

While none of the respondent schools reported using such pesticides, pesticide products containing known or probable carcinogens are widely available to the general public, and may be used in schools. The health risks of using such substances are not worth it, particularly when children are so vulnerable to toxic materials. Although the risk of using such potentially carcinogenic pesticides may sometimes be worthwhile to protect against disease or to ensure a continuing food supply, the benefits of pesticides used simply to produce weed-free athletic fields or lawns are far less.

Pesticides containing known or probable carcinogens should not be used for aesthetic purposes like lawn care, because the risks they pose are *not* outweighed by the benefits of an aesthetically pleasing lawn. In fact, such a lawn is achievable without the use of pesticides.

The emergency management plans that school districts are required to prepare should address emergencies involving pesticides.[20]

In the event that an accidental pesticide spill, over-application or exposure occurs at a school, the school should be fully prepared to respond. Administrators, teachers and other staff should be properly trained to identify a pesticide emergency situation, know whom to contact, when to evacuate, and how to minimize contact and risk.

This survey of pesticide use in New York State public schools documents the wide use of pesticides in schools throughout the State. This study demonstrates the need for schools to review and upgrade their efforts to minimize pesticide use and to use them (if determined to be absolutely necessary) with appropriate care and precautions. We hope that this report will foster dialogue and promote a broad shift by school communities to less toxic pest control methods. The environment in which our children learn and play need not be jeopardized by unnecessary or inappropriate use of toxic chemicals.

Credits: This report was originally prepared in 1993 by:

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APPENDIX A: New York Schools Completing Pesticide Survey

Responding schools from outside New York City are listed. As noted in the report, a single response was provided by the New York City Board of Education Pest Control Unit for all New York City public schools surveyed. All schools except those marked by asterisk reported using pesticides.

ALLEGANY COUNTY

Wellsville Middle School
30 No. Brooklyn Ave.
Wellsville, NY 14895

Bolivar Elementary School
100 School St.
Bolivar, NY 14715

Alfred Almond J S H S
Almond, NY 14804

BROOME COUNTY

West Middle School
West Junior Ave.
Binghamton, NY 13905

Whitney Point S H S
Keibel Rd.
Whitney Point, NY 13862

W A Olmsted Elementary School *
Harpursville, NY 13787

CATTARAUGUS COUNTY

Pioneer Middle School
Old Olean Rd.
Yorkshire, NY 14173

Franklinville Elementary School
32 No. Main St.
Franklinville, NY 14737

Allegany High School
No. Fourth St.
Allegany, NY 14706

CAYUGA COUNTY

Southern Cayuga H S *
Poplar Ridge, NY 13139

CHAUTAUQUA COUNTY

Cassadaga Valley H S
P O Box 540 Rte. 60
Sinclairville, NY 14782

G. A. Persell Middle School
375 Baker St.
Jamestown, NY 14701

Pine Valley Elementary School

So. Dayton, NY 14138

CHEMUNG COUNTY

Cohen Elementary School
Robinwood Ave.
Elmira Heights, NY 14903

Horseheads Middle School
Sing Rd.
Horseheads, NY 14845

CHENANGO COUNTY

Norwich H S
Midland Dr.
Norwich, NY 13815

Greene Middle School
So. Canal St.
Greene, NY 13778

CLINTON COUNTY

Northside Elementary School *
High School Bldg
Peru, NY 12972

Saranac H S
Saranac, NY 12981

COLUMBIA COUNTY

Germantown H S
Germantown, NY 12526

Mary E. Dardess Elem. School
Woodbridge Ave.
Chatham, NY 12037

CORTLAND COUNTY

Franklyn S. Barry School
Raymond Ave.
Cortland, NY 13045

Cincinnatus J S H S
Cincinnatus, NY 13040

Marathon H S *
1 East Main St.
Marathon, NY 13803

DELAWARE COUNTY

Hancock Elementary School *

Wheeler St. Ext

Hancock, NY 13783

DUTCHESS COUNTY

Seymour Smith Elementary School *
Academy St.
Pine Plains, NY 12567

ERIE COUNTY

Bennet High School *
2885 Main St.
Buffalo, NY 14214

Mill Middle School *
505 Mill St.
Williamsville, NY 14221

Armor Elementary School *
5301 Abbott Rd.
Hamburg, NY 14075

ESSEX COUNTY

Ticonderoga S H S
Calkins Pl.
Ticonderoga, NY 12883

Lake Placid J S H S
Main St.
Lake Placid, NY 12946

Moriah Elementary School
Hcr #1 Box 7A
Port Henry, NY 12974

FRANKLIN COUNTY

Malone J H S
Webster St.
Malone, NY 12953

L P Quinn Elem. School *
Hosley Ave.
Tupper Lake, NY 12986

FULTON COUNTY

Broadalbin-Perth Middle School
R D 4
Amsterdam, NY 12010

Northville Elementary School

Third St.
Northville, NY 12134

GENESEE COUNTY

Batavia H S *
260 State St.
Batavia, NY 14020

Byron-Bergen Middle School *
Town Line Rd.
Bergen, NY 14416

D B Bunce Elementary School
Pavillion, NY 14525

GREENE COUNTY

Coxsackie-Athens Middle School
Sunset Blvd.
Coxsackie, NY 12051

HAMILTON COUNTY

Indian Lake Central School *
28 W. Main St.
Indian Lake, NY 12842

Long Lake Central School *
Long Lake, NY 12847

Lake Pleasant School
Elm Lake Rd.
Speculator, NY 12164

HERKIMER COUNTY

Marcella M. Foley J H S *
No. Bellinger St.
Herkimer, NY 13350

Mohawk High School
28 Grove St.
Mohawk, NY 13407

JEFFERSON COUNTY

Watertown S H S
1335 Washington St.
Watertown, NY 13601

Dexter Elementary School *
Dexter, NY 13634

Lowville J S H S
7668 State St.

Lowville, NY 13367

Copenhagen Elementary School
Mechanic St.
Copenhagen, NY 13626

Port Leyden Elem. School *
Port Leyden, NY 13433

Livonia J S H S
Big Tree St.
Livonia, NY 14487

Dansville J H S
31 Clara Barton St.
Dansville, NY 14437

MADISON COUNTY

Chittenango High School
Genesee St.
Chittenango, NY 13037

MONROE COUNTY

Churchville-Chili Middle School
139 Fairbanks Rd.
Churchville, NY 14428

MONTGOMERY COUNTY

Lynch Middle School
Coolidge Rd.
Amsterdam, NY 12010

Fort Plain H S
West St.
Fort Plain, NY 13339

D. H. Robbins Elem. School *
St. Johnsville, NY 13452

NIAGARA COUNTY

Lasalle Senior High School
Military Rd.
Niagara Falls, NY 14304

Newfane Middle School
2700 Transit Rd.
Newfane, NY 14108

Thomas Marks Elem School *
430 Young St.
Wilson, NY 14172

NASSAU COUNTY

Shore Road School *
Shore Rd.
Bellmore, NY 11710

Willets Road School *
455 I U Willets Rd.
Roslyn Heights, NY 11577

Landing School
Mcloughlin St.
Glen Cove, NY 11542

Lakeville School
47-27 Jayson Ave.
Great Neck, NY 11020

Island Tres S H S *
59 Straight Ln.
Levittown, NY 11756

Lindell Boulevard School
Lindell Blvd.
Long Beach, NY 11561

Massapequa H S
4925 Merrick Rd.
Massapequa, NY 11758

Mineola Middle School
200 Emory Rd.
Mineola, NY 11501

North Shore S H S
450 Glen Cove Ave.
Glen Head, NY 11545

Oceanside S H S
Brower & Skillman Ave.
Oceanside, NY 11572

Lawrence Road J H S
Lawrence Rd.
Hempstead, NY 11550

Wantagh Middle School
Beltagh Ave.
Wantagh, NY 11793

Geo Washington School
347 William St.
W. Hempstead, NY 11552

ONEIDA COUNTY

New Hartford S H S

Oxford Rd.
New Hartford, NY 13413

Wesatmoreland Elementary
School(Deforest Hill)
Rte 233
Westmoreland, NY 13490

ONTARIO COUNTY

Canandaigua Junior Academy
235 No. Main St.
Canandaigua, NY 14424

Honeoye Elementary School
78 East Main St.
Honeoye, NY 14471

ORANGE COUNTY

Highland Falls Elem. School
P O Box 287
Highland Falls, NY 10928

ORLEANS COUNTY

Albion H S
302 East Ave.
Albion, NY 14411

Kendall Elementary School
Kendall Rd.
Kendall, NY 14476

Holley Middle School
Lynch Rd.
Holley, NY 14470

OSWEGO COUNTY

Oswego Senior High School
2 Buccaneer Blvd.
Oswego, NY 13126

Altmar Parish-Wmstown Mid School
County Route 22
Parish, NY 13131

Elm Street Elem. School *
700 Elm St.
Phoenix, NY 13135

OTSEGO COUNTY

Oneonta S H S *
East St.

Oneonta, NY 13820

Cooperstown Middle School
Linden Ave.
Cooperstown, NY 13326

Unadilla Elementary School
Main St.
Unadilla, NY 13849

PUTNAM COUNTY

Carmel Senior High School
30 Fair St.
Carmel, NY 10512

Putnam Valley JHS *
142 Peekskill Hollow Rd.
Putnam Valley, NY 10579

(excluded from calculations)
John F. Kennedy Elementary School
Foggintown Rd.
Brewster, NY 10509

ROCKLAND COUNTY

Nyack Middle School
131 Fifth Ave.
Nyack, NY 10960

Sloatsburg Elementary School
Second St.
Sloatsburg, NY 10974

ST. LAWRENCE COUNTY

Massena Senior High School
Highland Ave.
Massena, NY 13662

A Kingston Middle School *
29 Leroy St.
Potsdam, NY 13676

Madrid Elementary School *
Madrid, NY 13660

SARATOGA COUNTY

Shenendehowa H S
970 Rte. 146
Clifton Park, NY 12065

Mechanicville Elementary School *
10 No. Main St.

Mechanicville, NY 12118

(excluded from calculations)
Ballston Spa Middle School
100 Wood Rd.
Ballston Spa, NY 12020

SCHENECTADY COUNTY

Iroquois Middle School
(Niskayuna Middle)
2495 Rosendale Rd.
Schenectady, NY 12309

Glendaal School
R D 2 Sacandaga Rd.
Scotia, NY 12302

SCHOHARIE COUNTY

Middleburgh HS
181 Main St.
Middleburgh, NY 12122

Ryder Elementary School
Elm St.
Cobleskill, NY 12043

Schoharie H S *
Main St.
Schoharie, NY 12157

SCHUYLER COUNTY

Howard A. Hanlon Elem. School
College Ave.
Odessa, NY 14869

Watkins Glen Central H S
12th St.
Watkins Glen, NY 12891

SENECA COUNTY

E Cady Stanton Elem. School
38 Garden St.
Seneca Falls, NY 13148

STEUBEN COUNTY

Wayland H S
2350 Route 63
Wayland, NY 14572

Jasper-Troupsburg Elem. School *
P O Box 98

Troupsburg, NY 14885

SULLIVAN COUNTY

Youngsville School
North Rd.
Youngsville, NY 12791

TIOGA COUNTY

Owego Free Academy
George St.
Owego, NY 13827

Lincoln Street Elem. School *
45 Lincoln St.
Waverly, NY 14892

SUFFOLK COUNTY

Andrew T. Morrow School
Sycamore Ln.
Central Islip, NY 11722

Easthampton H S
2 Long Ln.
Easthampton, NY 11937

Elwood Middle School
478 Elwood Rd.
E. Northport, NY 11731

Oldfield Middle School
2 Oldfield Rd.
Greenlawn, NY 11740

Longwood H S
Longwood Rd.
Middle Island, NY 11953

North Country Road School *
191 No. Country Rd.
Miller Pl., NY 11764

E L Vandermeulen H S
Old Post Rd.
Port Jefferson, NY 11777

Riverhead Middle School
600 Harrison Ave.
Riverhead, NY 11901

Smithtown H S East
Northern Blvd.
St. James, NY 11780

Walt Whitman H S
301 West Hills Rd.
Huntington Station, NY 11746

Southampton Interm.School
70 Leland Ln.
Southampton, NY 11968

Westhampton Beach Elem. School *
Mill Rd.
Westhampton Beach, NY 11978

(excluded from calculations)

TOMPKINS COUNTY

Lansing Middle School
6 Ludlowville Rd.
Lansing, NY 14882

Groton Elementary School
Elm St.
Groton, NY 13073

ULSTER COUNTY

Kingston S H S
403 Broadway
Kingston, NY 12401

Ellenville Elementary School
Maple Ave.
Ellenville, NY 12428

New Paltz Middle School
So. Manheim Blvd.
New Paltz, NY 12561

WARREN COUNTY

Queensbury S H S *
99 Aviation Rd.
Queensbury, NY 12804

Stuart M. Townsend School
Hyland Dr.
Lake Luzern, NY 12846

Lake George Elem. School *
Rte. 9 L Sun Valley Dr.
Lake George, NY 12845

WASHINGTON COUNTY

Hudson Falls S H S
80 E Labarge St.

Hudson Falls, NY 12839

Granville J H S
Quaker St.
Granville, NY 12832

WAYNE COUNTY

Newark Senior High School *
625 Peirson Ave.
Newark, NY 14513

Lyons J S H S
10 Clyde Rd.
Lyons, NY 14489

WESTCHESTER COUNTY

Gorton H S
Shonnard Pl.
Yonkers, NY 10701

Anne M. Dorner Middle School
Van Cortlandt Ave.
Ossining, NY 10562

WYOMING COUNTY

Perry Elementary School
59 Leicester St.
Perry, NY 14530

Letchworth J S H S
School Rd.
Gainesville, NY 14066

YATES COUNTY

Penn Yan Elem. School *
101 Maple Ave.
Penn Yan, NY 14527

Dundee J S H S
55 Water St.
Dundee, NY 14837

APPENDIX B: Some Active Pesticide Ingredients Reported Used By Schools

GENERAL USE PESTICIDES*	
2,4-D	diquat dibromide
2,4-MCPA	glyphosate
2,4-MCPP	pendimethalin
acephate	piperonyl butoxide (a synergist)
allethrin	
boric acid	prometon
bromacil	prpoxur
chlorpyrifos	pyrethrins
DEET	siduron
diazinon	tetramethrin
dicamba	

RESTRICTED USE PESTICIDES**	
bendiocarb***	dichlorvos (above 1%)
brodifacoum (above 0.005%)	fenvalerate***
bromethalin (above 0.01)	isophenfos (above 2%)
cyfluthrin***	permethrin***
cypermethrin***	propetamphos***

* Listed by common chemical names, which may be used in a variety of products and sold under different brand names.

** Formulations containing these pesticides, over the concentrations noted, are classified as restricted use pesticides due to their high acute toxicity to humans and animals.

*** The "restricted use" pesticides marked by asterisks are restricted by both the federal government and by New York State. The others are restricted by New York State but not nationally.

APPENDIX C: Some Sources of Information about Integrated Pest Management

Note: As with any other purchasing activity, schools should exercise caution in selecting a contractor to implement an Integrated Pest Management program. Have a clear idea of what you want, and choose a contractor with the training, experience and equipment needed to deliver it. Be aware that a wide variety of services may be offered as "integrated pest management" and that not all will necessarily fit your requirements. Some of the references listed below will help schools to get exactly the services they desire.

1. Olkowski, W., S. Daar and H. Olkowski "Common Sense Pest Control." The Taunton Press, Newton, Conn., 1991, xix + 715 pp. (This book is encyclopedic in its coverage of pests and pest control methods. It provides practical and easy-to-understand guidance.)

2. Schultz, W. "The Chemical-Free Lawn." Rodale Press, Emmaus, Pa., 1989, xi

+ 194 pp. (A straightforward guide to lawn establishment and maintenance without pesticides.)

3. New York State Office of General Services, Division of Technical Services, "Modern Pest Control Techniques Handbook (A Generalist's Guide to Integrated Pest Management)" May 1992, 23 pp. (This monograph is management contractors. It discusses IPM techniques as well as contracting for services.)

4. New York State Office of General Services, Division of Technical Services, "Specification - Pest Control Through Integrated Pest Management - January 5, 1993." (These contract specifications, intended to provide a comprehensive IPM program for State buildings, should be useful to school administrators seeking to use an outside contractor.)

5. Illinois Department of Public Health, "Integrated Management of Structural Pests in Schools - 1994." 21 pp. (A guide for developing IPM programs for schools. Contract the Division of Environmental Health at 217-782-5830 to obtain a copy.)

6. United States Environmental Protection Agency, Office of Pesticide Programs, "Pest Control in the School Environment: Adopting Integrated Pest Management." EPA 735-F-93-012, August, 1993, ii + 43 pp. (Designed to acquaint readers with IPM, this brochure identifies ways to reduce dependence on pesticides. Contact the USEPA Public Information Center, 401 M Street SW, Washington, DC 20460 for a copy.)

7. Contact organizations such as:

New York Coalition for Alternatives to Pesticides
P.O. Box 6005
Albany, N.Y. 12206
(518) 426-8246

Bio-Integral Resource Center
P.O. Box 7414
Berkeley, CA 94707
(510) 524-8404

Cornell University IPM Program
New York State Agricultural Experiment Station
Geneva, N.Y. 14456
(315) 787-2353

or

Contact your local Cooperative Extension Office.

Notes

1. Throughout this report, the word "pesticides" is used broadly to include herbicides, insecticides and rodenticides intended to kill, repel or otherwise control mice, rats, vermin, insects, weeds, etc. indoors as well as outdoors. For the purposes of this report, cleaning products which might contain pesticidal ingredients were omitted.

2. United States Environmental Protection Agency, "Healthy Lawn, Healthy Environment", Office of Prevention, Pesticides and Toxic Substances, June 1992.

3. United States Environmental Protection Agency, "Superfund Public Health Evaluation Manual" (EPA 540/1-86/060), October 1986, p. 63.

4. Natural Resources Defense Council, "Intolerable Risk: Pesticides in Children's Food" February, 1989.

5. Ibid.

6. The compiled results of the survey are based on the written responses to the survey, as well as additional information verbally provided to us by the schools and the New York City Board of Education Pest Control Unit.

7. United States General Accounting Office, April 1986, "Nonagricultural Pesticides Risks and Regulations," GAO/RCED-86-97, p.4.

8. One study has linked pesticide exposure to childhood leukemia. (Lowengart et al., 1987. Childhood Leukemia and Parents' Occupational and Home Exposures. Journal of the National Cancer Institute 79[1]:39-46.) Researchers found that children in homes where pesticides are regularly used are 3.8 times more likely to develop leukemia; the study also showed that regular use of lawn pesticides was associated with a 6.5 times greater risk of leukemia. The effect, if any, of regular exposure in schools has not been evaluated.

9. Litovitz, T.L. et al. Annual Report for 1991, of the American Association of Poison Control Centers National Data Collection System, as reprinted in the American Journal of Emergency Medicine (10:452-505, 1992).

10. United States General Accounting Office, April 1986, "Nonagricultural Pesticides Risks and Regulations," GAO/RCED-86-97, p.4.

11. Memorandum dated September 27, 1991, from EPA Office of the Inspector General to Linda J. Fisher, Assistant Administrator for Pesticides and Toxic Substances.

12. United States General Accounting Office, April 1986, "Nonagricultural Pesticides Risks and Regulation," GAO/RCED-86-97, p. 42.

13. ECL Section 33-1003 imposes these posting requirements on schools; however, Section 33-0101(46) exempts "the application of pesticides around or near the foundation of a building for the purpose of indoor pest control. . . ." Unfortunately, current law does not require warning markers when pesticides are applied inside school buildings. DEC promulgated regulations to require such posting in 1988, but they were invalidated by the courts in 1990.

14. These records include the kind and quantity of each pesticide used; dosage rates; methods of application; target organisms; and the use, date and place of application for each pesticide used. The records must be maintained on an annual basis, and must be kept for a minimum of three years. 6 New York Code of Rules and Regulations ("NYCRR") Sections 325.25(a) and (c).

15. Olkowski, W., S. Daar & H. Olkowski, "Common Sense Pest Control," The Taunton Press, 1991. xix & 715 pp.

16. The term "IPM" has been loosely used by some simply to mean using fewer pesticides. However, in its best sense, IPM seeks to eliminate the use of toxic chemical pesticides altogether, preferring to control pests with the least toxic methods with the least impact on human health and the environment. IPM assumes that a pest need not be controlled until it becomes in fact a nuisance or economically significant. This approach requires monitoring and record keeping to identify the presence and levels of pests and their natural enemies. When an injury level sufficient to warrant control has been reached, the type of action necessary should be based on the pest population size and other variables such as weather. Appropriate action may include a variety of treatments, including mechanical controls, physical barriers, and chemical controls such as hormones to confuse the pest, arrest its development, or interfere with its breeding. Pesticides should be used only as a last resort, and then only in a manner designed to minimize exposure of people and other non-target organisms.

Statewide "least toxic, least impact" pest control (or IPM) guidelines should be drafted to provide relevant direction to schools. Until such time as they are, schools may seek guidance from various resources, including other school districts which have implemented IPM, the New York Coalition for Alternatives to Pesticides (NYCAP) in Albany, the Bio-Integral Resource Center (BIRC) in Berkeley, California, and the National Coalition Against the Misuse of Pesticides (NCAMP) in Washington, D.C.

17. New York State Environmental Conservation Law 33-0905(1); 6 NYCRR Section 325.17.

18. 6 NYCRR Part 325, Appendix 8-C.

19. 6 NYCRR Section 325.20.

20. This requirement is established under Title 8 of the New York Code of Rules and Regulations, Section 155.13.